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REVIEWS

LAKE MAXINKUCKEE, A PHYSICAL AND BIOLOGICAL SURVEY[1]

While a good deal has been said and written concerning the desirability of ecological surveys of particular physiographic features, such surveys have seldom been made. The present publication is a notable example of this character. It is the fruition of a thoroughgoing study of a typical Middle West glacial lake, a study which was begun more than twenty years ago under the auspices of the United States Bureau of Fisheries and which has extended over a period of some fifteen years. The investigations were undertaken as a result of the need of exact knowledge of the physical and biological conditions obtaining in different types of lakes and streams. Among the more important purposes to be considered were the following: (1) To gain a fairly good understanding of the physical and biological conditions obtaining in a typical glacial lake. (2) To study carefully and fully the habits of as many species of animals and plants of the lake as time permitted. (3) To study carefully the physical and biological conditions under which the more important of these species thrive (Volume I, page 15).

That the authors have achieved a signal success becomes increasingly evident as the volumes are examined. Following the introduction the discussion is divided between two major headings, Physical Features and Biology. Under the first the physiography of the lake, its hydrography, and the meteorology of the region are considered. Under the second the various forms of life are treated, major emphasis being placed on the fishes. In addition to the fishes the mammals, birds, insects, mollusks, crustaceans, leeches, protozoans, coelenterates, worms, sponges, plankton, and the flora of the lake and its immediate vicinity are successively considered, the greater portion of the second volume being devoted to a general discussion and lists of the plants, aquatic and terrestrial, with valuable annotations as to occurrence and relationship. The chapter on dragon-flies was written by Charles B. Wilson; on crayfishes, by W. P. Hay; on the leeches, by J. Percy Moore; and on the plankton by Chancey Juday.

The point of view throughout is ecological, and the title of the work might well have been shortened to read "An Ecological Survey of Lake Maxinkuckee." As the authors state (Volume I, page 18), "It may be thought by some that the scope of the report is too broad, that subjects are included which do not bear any relation to fish-culture. Such is not the case. There is probably not a species of animal or plant in or about the lake that does not bear some relation, more or less important, to the fish-life of the lake. The truth of this impresses itself more and more evidently upon one as he becomes more and more fully acquainted with the relations and inter-relations of the multitude of species of animals and plants in and about the lake, and their dependence and interdependence among and upon each other."

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[1] Evermann, Barton Warren, and Clark, Howard Walton, "Lake Maxinkuckee, A Physical and Biological Survey." Dept. of Conservation, State of Indiana, 1920, 2 vols., vol. I, pp. 1-660, 9 half tone plates, 38 colored plates, 23 text figs., map; vol. II, pp. 1-512.

The practical importance of the investigations is apparent when it is recalled that " In the past millions upon millions of fish have been planted in the lakes and streams of the United States and usually without any scientific investigation whatever for the purpose of determining whether the waters were suitable for the fish which it was proposed to plant in them. The result is that hundreds of thousands of dollars have been spent and millions of fish wasted without any results of value being obtained.

" No stream or lake should be stocked with fish until it has been carefully studied by a competent biologist and found to possess the conditions or factors of a favorable environment for the fish which it is proposed to introduce. Fish culturists should adopt this principle and adhere to it as an invariable policy. The rule-of-thumb, cut-and-try method so uniformly followed has brought no credit to fish culture in America" (Volume I, pages 222, 223).

The necessity for careful studies by competent biologists in advance of far-reaching decisions is fortunately coming to be increasingly realized, not only in the province of the fisheries, but in other fields of action where biological dispositions must be made, as for example, the control of rodents and predatory animals, the regulation of hunting and the conservation of nature, the administration of the fauna and flora of national and state parks and monuments, the regulation of grazing and the administration of forests. The results of the work of Dr. Evermann and Mr. Clark are eloquent of the validity of the principle that in all such cases the services of the biological engineer are fundamentally necessary if the people's money and energy are to be wisely expended.

It was found that no hard and fast line could be drawn between species directly and those only indirectly related to the lake. Species of purely land animals and plants were found to be ecologically related to purely aquatic species. The discussion of this phase of the study, as given on pages 236 and 237 of Volume I, and elsewhere through the work, is of fascinating interest. Facts are presented clearly indicating that many of the plants and animals which one would not ordinarily associate are linked together in an ecological chain, usually invisible and often difficult to trace, but often of a good deal of importance.

The authors have presented their material from the natural history point of view, and have been remarkably successful in infusing an unusual amount of human interest into their facts and figures. The style is non-technical, and systematic considerations have been minimized.

Volume I is illustrated by a number of excellent line-cuts and color plates of fishes. A bibliography of some ninety papers which relate to Lake Maxinkuckee in one way or another is given; and well-written indexes are to be found at the end of each volume.

One result of the energy and persistence of the authors is that "more is probably known of Lake Maxinkuckee, particularly of its biology, than of any other lake in the world." The Department of Conservation of the State of Indiana is to be congratulated on the publication of this work; though it seems unfortunate that, since the work was all done under Governmental auspices, the United States Bureau of Fsheries could not have arranged for publication.

WALTER P. TAYLOR